

# HabEx Trade Studies

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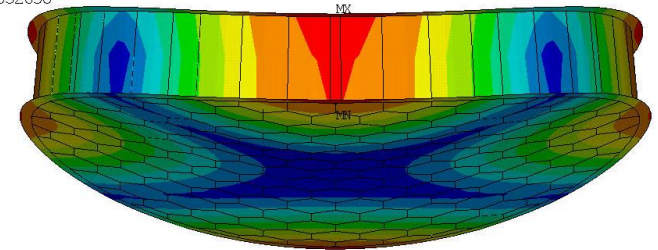
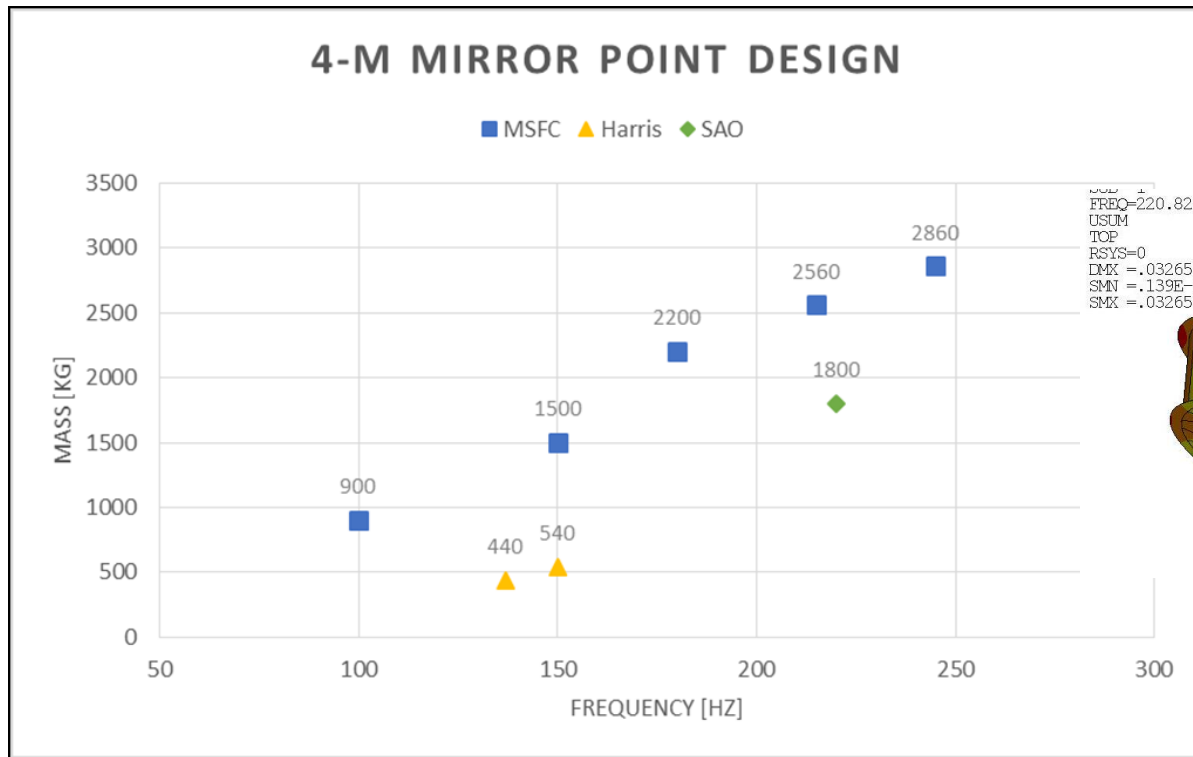
NASA Mirror Technology Days 2016



# HabEx 4-m Mirror Trade Studies

AMTD has produced multiple 4-m Point Designs

- Harris Corporation explored lower limit of mass.
- MSFC explored range of higher mass, more robust designs.



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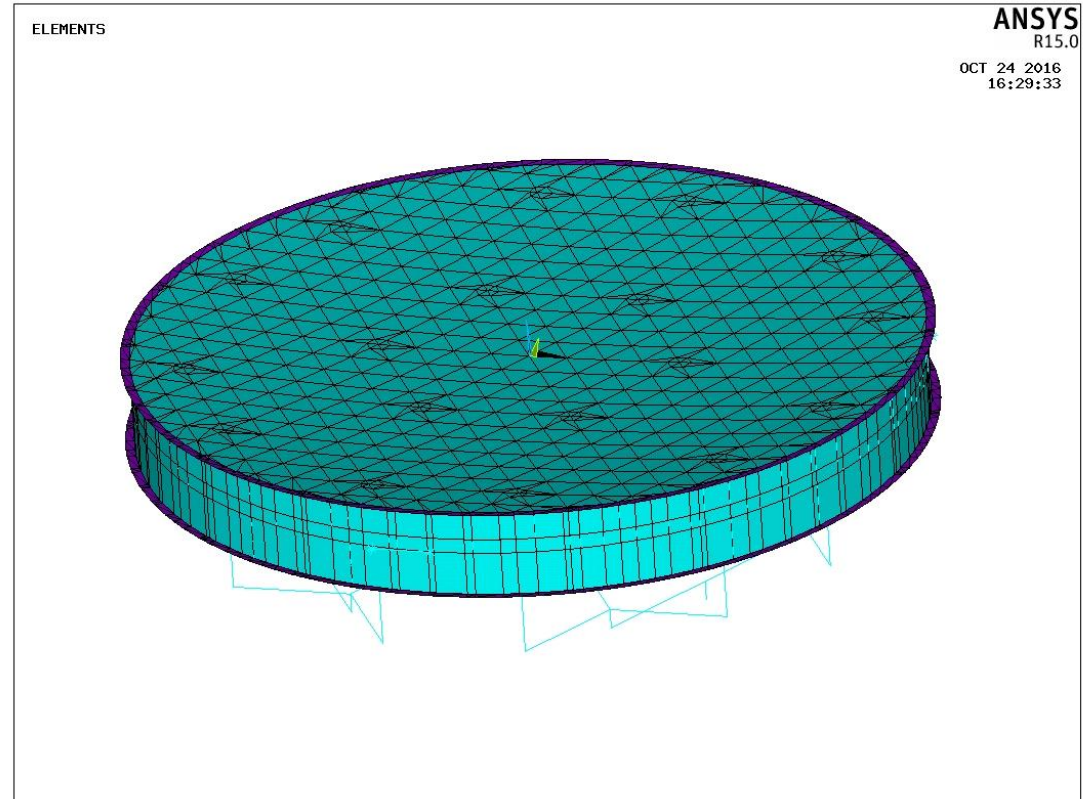
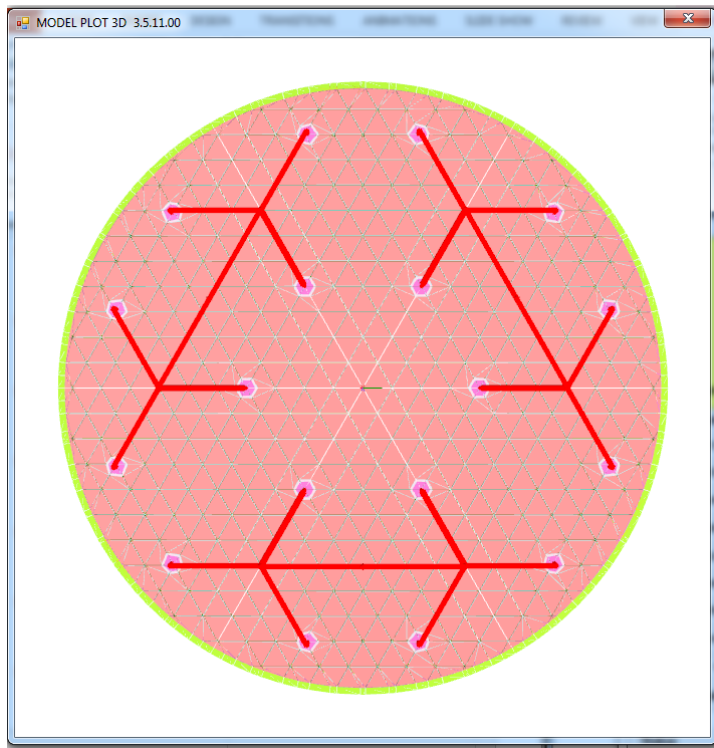


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depth (m)	0.4	0.45	0.6	0.75
mass (kg)	980	2200	2475	2860
cell size (m)	0.167	0.167	0.167	0.167
front fs (m)	0.013	0.0277	0.028	0.0277
back fs (m)	0.013	0.0231	0.023	0.0231
1st mode (Hz)	110	180	215	245
3-point Vertical Gravity Sag [um]	11.77	9.73	7.28	5.41
6-point Vertical Gravity Sag [um]	4.30	3.49	2.63	1.97
9-point Vertical Gravity Sag [um]	2.83	2.47	1.39	1.39
18-point Vertical Gravity Sag [um]	1.40	1.12	1.00	0.80



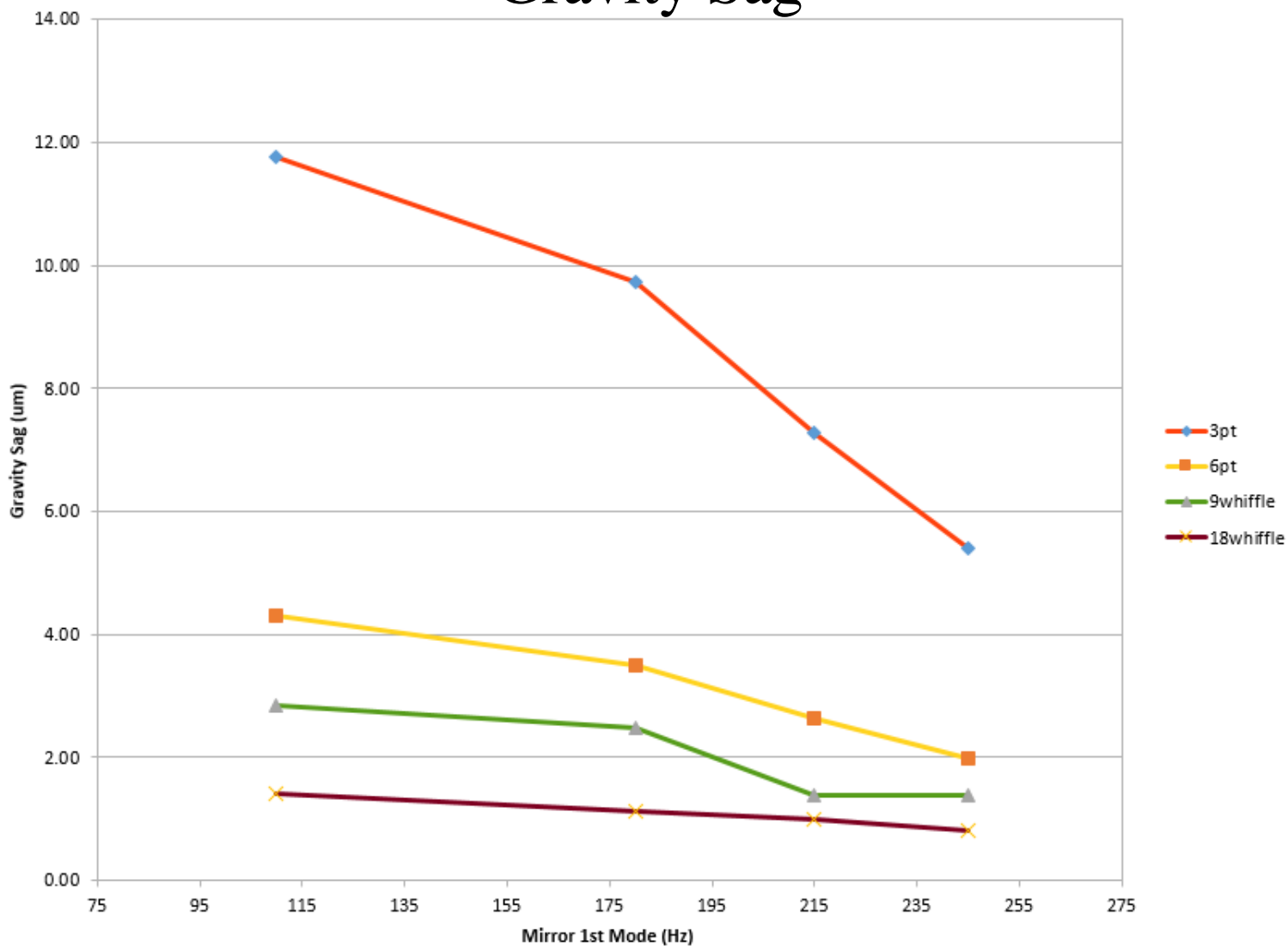
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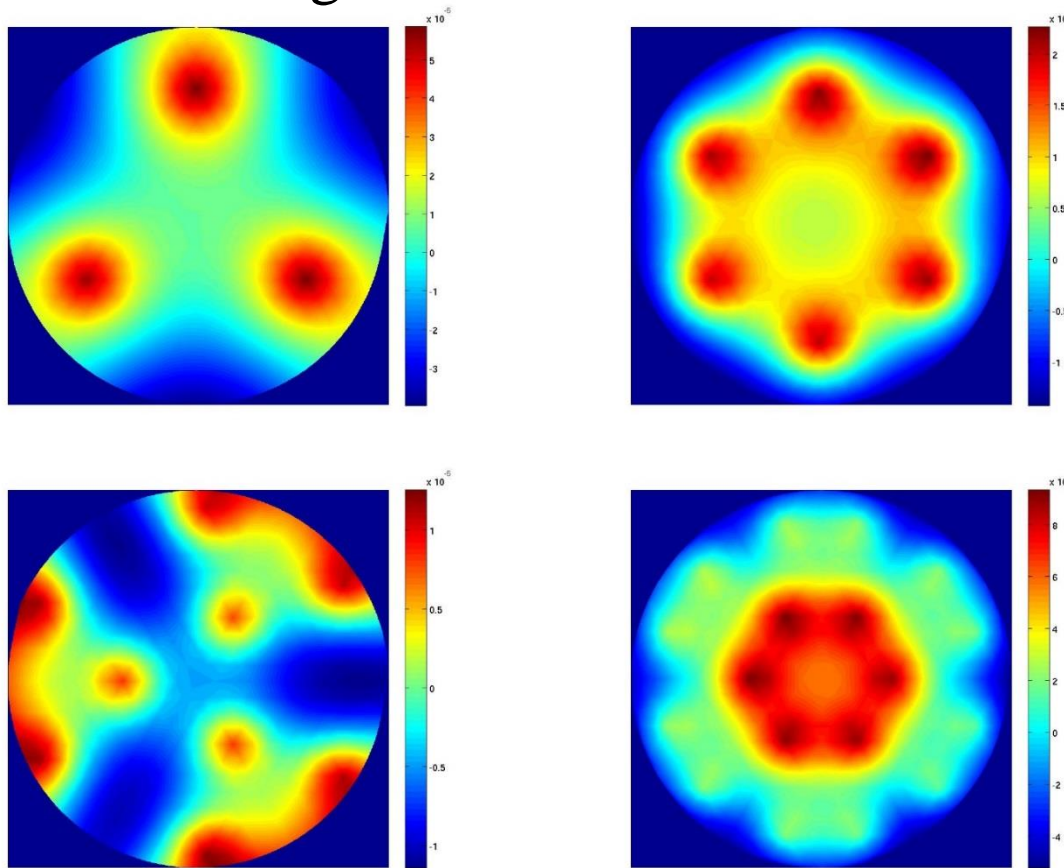
## Gravity Sag





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## Gravity Sag – Piston & Tilt Design 2: 180Hz 1<sup>st</sup> mode



Gravity Sag of 9-point and 18-point mounts can be reduced by adjusting the cell sizes to optimize mount pad locations.



# Conclusions

Continuing improvement of Arnold Mirror Modeler for rapid design of mirror substrates and support systems to enable point design trade studies.

Using AMM for HabEx Trade Studies

Expecting first 'Release'